Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ZINE-EDDINE BOUTAGHOU and
PETER RAYMOND SEGAR

Appeal No. 2001-1268
Application No. 09/100,698

ON BRIEF

Before KRASS, FLEMING and SAADAT, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claim 3, the sole claim on appeal.

The invention is directed to a disc drive head slider. In particular, the data transducer is supported by an air bearing structure in operative, non-contacting engagement with the surface of the rigid magnetic recording disc. It is said that

the advantage over the prior art lies in the reduction of static friction, or "stiction," caused by formation of a liquid meniscus between the air bearing structure and the disc surface, due to the unavoidable presence of water vapor within the disc drive housing. While the prior art sought to overcome the stiction problem by adding landing pads extending beyond the air bearing surfaces in the direction of the disc, reducing contact area between the head assembly and the disc, this also served to limit the proximity of the transducer on the head assembly to the disc. In attempts to increase proximity of transducer to disc, the height of the landing pads was reduced, but this increased stiction.

While prior art designers were faced with mutually contradictory alternatives for allowing for increased areal recording density by lowering the height of the landing pads, or reducing the stiction by raising the height of the landing pads, the instant invention is said to overcome this mutually exclusive requirement by decoupling the overall height of the landing pads from the extent by which the landing pads extend below the air bearing surfaces. This is accomplished by providing recessed surfaces from which the landing pads extend. Accordingly, the overall height of the landing pad features can be optimized to

reduce stiction caused by formation of a liquid meniscus at the landing pads, while simultaneously still allowing the height by which the landing pads extend below the air bearing surfaces to be optimized for increased areal recording density.

Claim 3 is reproduced as follows:

3. A disc drive, comprising:

a slider supportable over a rotatable disc; and

stiction reduction means for reducing stiction between the slider and the rotatable disc.

The examiner relies on the following references:

Best et al. (Best)	5,285,337	Feb. 8, 1994
(Japanese Patent)[1] Okada et al.	4-341984	Nov. 27, 1992

Claim 3 stands rejected under 35 U.S.C. 102(b) as anticipated by either one of Best or Okada.

Reference is made to the briefs and answer for the respective positions of appellants and the examiner.

[1]Our understanding of the Okada reference is based on an English translation thereof prepared for the United States Patent and Trademark Office, a copy of which is attached hereto.

OPINION

With regard to Best, the examiner points out that Best discloses a disc drive, as seen in Figures 1 and 2, comprising a slider, as in Figures 8A-D, supportable over a rotatable disc 16, and a stiction reducing means, identified as elements 120, 122, 132, 134, 136, 138 and 140.

Since the stiction reducing means is set forth in instant claim 3 in "mean plus function" language, the examiner compares the structure of Best with the instant disclosure, concluding that the Best arrangement of air bearing surfaces 110, 112 that are provided to fly the slider with the air bearing surfaces above the disc surface, and a plurality of landing pads 120, 122, 132, 134, 136, 138, 140, each having a contact surface which extends by a first height below the ABS's toward the disc surface, and extends by a second height greater than the first height from a recessed surface farther from the disc surface than the ABS's (Figures 8A-9F), is structurally equivalent to appellants' invention.

With regard to Okada, the examiner points out that Okada discloses a disc drive having a slider 1 supportable over a rotatable disc 11 and stiction reducing means 9. The

corresponding structure to the stiction reducing means in Okada is said by the examiner to be the air bearing surfaces 5 provided to fly the slider with the air bearing surfaces and transducer above the disc surface, and the plurality of landing pads, 9, each having a contact surface which extends by a first height below the ABS's toward the disc surface, and by a second height greater than the first height from a recessed surface farther from the disc surface than the ABS's (Figures 1 and 4). Accordingly, the examiner concludes that the stiction reducing means in Okada is structurally equivalent to that disclosed by the instant invention.

Appellants do not dispute that the applied references each shows a disc drive, a supportable slider and a stiction reducing means for reducing stiction between the slider and the rotatable disc. Rather, appellants invoke In re Donaldson, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994) and conclude that since the stiction reducing means is in "means plus function" format, the instant claimed elements must be construed as the mechanisms explicitly disclosed or "equivalents thereof." Appellants urge that the claimed "stiction reducing means" must be construed as the structure shown in Figures 4-3, 5-1 and 5-2 of the instant application and as described in the instant specification.

In accordance with Donaldson, in considering means plus function language, one must look to the specification and interpret that language in light of the corresponding structure, method or other acts described therein and equivalents thereof to the extent that the specification provides such disclosure. The instant claim language "stiction reduction means for reducing stiction..." is clearly "means plus function" language, in accordance with Donaldson. No specific structure is set forth in the claim so we must look to the disclosure to ascertain the meaning of "stiction reduction means for reducing stiction..." and equivalents thereof. Appellants and the examiner are in agreement on this.

Turning to the disclosure to identify the corresponding structure for this "means plus function" element, we find, as argued by appellants at the top of page 11 in the principal brief, that this claim element is properly construed as the structure shown in Figures 4-3, 5-1 and 5-2 of the application and described in associated portions of the specification. In further describing the structure, at that portion of the principal brief, appellants point out that Figures 4-3, 5-1 and 5-2, describing the claimed element, explicitly show a slider (60 in FIGS. 5-1 and 5-2) for supporting a data transducer (70 in

FIG. 5-2) in a cooperative, non-contacting arrangement above a disc surface of a rotating data storage disc (8 in FIG. 4-3) comprising a disc facing surface (58 in FIG. 4-3, 72/74 in FIGS. 5-1 and 5-2) having four corners, an arrangement of air bearing surfaces (38 in FIG. 4-3, 38/68 in FIG. 5-1, 66/68 in FIG. 5-2) formed on said disc facing surface at a first height (height from surface 58 to surface 38 in FIG. 4-3, and height from surfaces 72/74 to surfaces 38/68 in FIG. 5-1) spaced from said disc facing surface, and at least four landing pads (62/64 in FIGS. 5-1 and 5-2) formed on said disc-facing surface, at least one each near a respective one of said four corners, to a second height (height from surface 58 to lower surface of element 52b in FIG. 4-3, and height from surfaces 72/74 to lower surface of elements 62/64 in FIG. 5-1) greater than the first height, wherein the ratio of the difference between the first and second heights to the first height is approximately 1:10 (as shown by the figures, and as explicitly noted in the specification at page 10, lines 16-20).

We will accept this description as identification of the structure corresponding to the claimed "stiction reduction means for reducing stiction..." and hold that such corresponding structure and "equivalents thereof" must include what is shown in instant Figures 4-3, 5-1 and 5-2, including the four landing pads

attached to the surfaces depicted, with two near the leading edge of the head/slider and two near the trailing edge of the head/slider, and the recesses 72 and 74, allowing for the first and second heights described by appellants, wherein the ratio of the difference between the first and second heights to the first height is approximately 1:10.

While both Best and Okada disclose "stiction reduction means for reducing stiction between the slider and the rotatable disc," with both references even showing four landing pads and recesses[2], neither of these references discloses the exact structure of instant Figures 4-3, 5-1 and 5-2, having the landing pads positioned exactly as shown, two at the leading edge and two at the trailing edge of the head/slider, and having recesses, as shown in the instant figures, such that the landing pads have contact surfaces which extend to a first height below the air bearing surface toward the disc surface, the landing pads extend to a second height greater than the first height from the recessed surface farther from the disc surface than the air bearing surface and the ratio of the difference between the first

[2]The examiner indicates (Answer-page 7) that these recesses are taught by Best in Figures 8A-9F and, by Okada, in Figures 1 and 4. Appellants do not dispute this teaching of "recesses" by the applied references.

and second heights to the first height is approximately 1:10.

In order to make it clear to readers of any patent which should issue from this application what the corresponding and equivalent structure for the claimed "...means for reducing stiction...," comprises, we recommend to appellants and the examiner that appellants amend the specification, consistent with this decision and MPEP 2181, to make clear the structure that corresponds to the stiction reducing means. This would provide notice to the public as to the scope of instant claim 3.

Since we agree with appellants anent the corresponding structure identified as the structure shown in Figures 4-3, 5-1 and 5-2, and the attendant descriptions thereof, e.g., the 1:10 ratio described at page 10, lines 16-20, the claimed element "stiction reduction means for reducing stiction between the slider and the rotatable disc" shall be construed to cover this corresponding structure and equivalents thereof.

Since neither Best nor Okada discloses what we have held to be structure corresponding to the claimed "stiction reduction means for reducing stiction between the slider and the rotatable disc," we will not sustain the rejection of claim 3 under 35 U.S.C. 102(b).

The examiner's decision is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
MAHSHID D. SAADAT Administrative Patent Judge	)	

EK/RWK

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